ASCENT
RESOURCES

May 8, 2017

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

RE: Application for Administrative Update (Class II)
Ascent Resources - Marcellus, LLC
Mary Miller
Facility ID: 103-00104
Permit: R13-3349

Dear Sir/Madam,

Ascent Resources – Marcellus, LLC (Ascent) owns and operates the Mary Miller facility (Facility), which is located in Wetzel County, West Virginia. The Facility is currently permitted under R13-3349, issued April 10, 2017.

Ascent is removing one (1) certified natural gas-fired generator and replacing it with one (1) certified natural gas-fired generator. To authorize the change, Ascent is submitting this application for a Class II Administrative Update. All other emissions sources are the same as represented in Permit R13-3349. The Facility consists of one (1) natural gas-fired generator, four (4) gas production units, five (5) line heaters, one (1) flash separator heater, three (3) condensate storage tanks, three (3) produced water storage tanks, one (1) enclosed combustor, and various support operations.

This Application has been prepared in accordance with the requirements set forth in 45CSR6, 45CSR13, and applicable guidance documents. Ascent will operate the Facility in compliance with applicable federal and state air quality regulations. The required attachments are included in addition to the application forms.

Enclosed is the original and two (2) copies of the application, along with the fee in the amount of $1,300. If you have any questions or need additional information, please feel free to contact me at 405-252-7753.

Sincerely,

Evan Foster Pearson
EH&S Air Compliance Specialist

Enclosures

Ascent Resources
Mary Miller
103-00104
13-3349A
Jonathan

Ascent Resources, LLC
P.O. Box 13678, Oklahoma City, OK 73113 • 3501 N.W. 63rd, Oklahoma City, OK 73116
Evan.Pearson@AscentResources.com

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WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☒ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office)*:
Ascent Resources – Marcellus, LLC

2. Federal Employer ID No. ***(FEIN)***:
46-5580354

3. Name of facility *(if different from above)*:
Mary Miller

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
PO Box 13678
Oklahoma City, OK 73113

5B. Facility's present physical address:
39.6149°N, -80.6138°W
Four Mile Road,
Wileyville, WV 26186

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: Lease
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Natural gas production

10. North American Industry Classification System **(NAICS)** code for the facility:
211111

11A. DAQ Plant ID No. (for existing facilities only):
103–00104

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-3349

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B.**

From Wileyville, WV, head south on Fairview Ridge Rd. toward WV-7 W. Turn left at the first cross street onto WV-7 E for 1.6 mi. Turn right onto Barker Run Rd. and go 3.6 mi. Turn left onto N Fork Rd and go 4.4 mi. Turn left onto Four Mile Rd. and go 0.9 mi to facility location.

12.B. New site address (if applicable):	12C. Nearest city or town: Wileyville	12D. County: Wetzel
12.E. UTM Northing (KM): 4385087	12F. UTM Easting (KM): 533150	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Ascent is removing one (1) certified natural gas-fired generator and replacing it with one (1) certified natural gas-fired generator.

14A. Provide the date of anticipated installation or change: / / – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:	14B. Date of anticipated Start-Up if a permit is granted: / /

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment D of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance*).**
– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**
– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	☐ Storage Tanks
☒ General Emission Unit, specify: Generator		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ DATE: 5/9/17

(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: John Adcock		35C. Title: VP-Operations
35D. E-mail: N/A	36E. Phone: N/A	36F. FAX: N/A
36A. Printed name of contact person (if different from above): Evan Foster Pearson		36B. Title: EH&S Air Compliance Specialist
36C. E-mail: evan.pearson@ascentresources.com	36D. Phone: 405-252-7753	36E. FAX: N/A

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

☒ **Attachment A: Business Certificate**
☒ **Attachment B: Map(s)**
☒ **Attachment C: Installation and Start Up Schedule**
☒ **Attachment D: Regulatory Discussion**
☒ **Attachment E: Plot Plan**
☒ **Attachment F: Detailed Process Flow Diagram(s)**
☒ **Attachment G: Process Description**
☒ **Attachment H: Material Safety Data Sheets (MSDS)**
☒ **Attachment I: Emission Units Table**
☒ **Attachment J: Emission Points Data Summary Sheet**
☐ **Attachment K: Fugitive Emissions Data Summary Sheet**
☒ **Attachment L: Emissions Unit Data Sheet(s)**
☐ **Attachment M: Air Pollution Control Device Sheet(s)**
☒ **Attachment N: Supporting Emissions Calculations**
☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
☒ **Attachment P: Public Notice**
☐ **Attachment Q: Business Confidential Claims**
☐ **Attachment R: Authority Forms**
☐ **Attachment S: Title V Permit Revision Information**
☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
☐ ***For Title V Administrative Amendments:***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
☐ ***For Title V Minor Modifications:***
  ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  ☐ ***EPA has 45 day review period of a draft permit.***

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Attachment A: Business Certificate

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

AMERICAN ENERGY-MARCELLUS, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

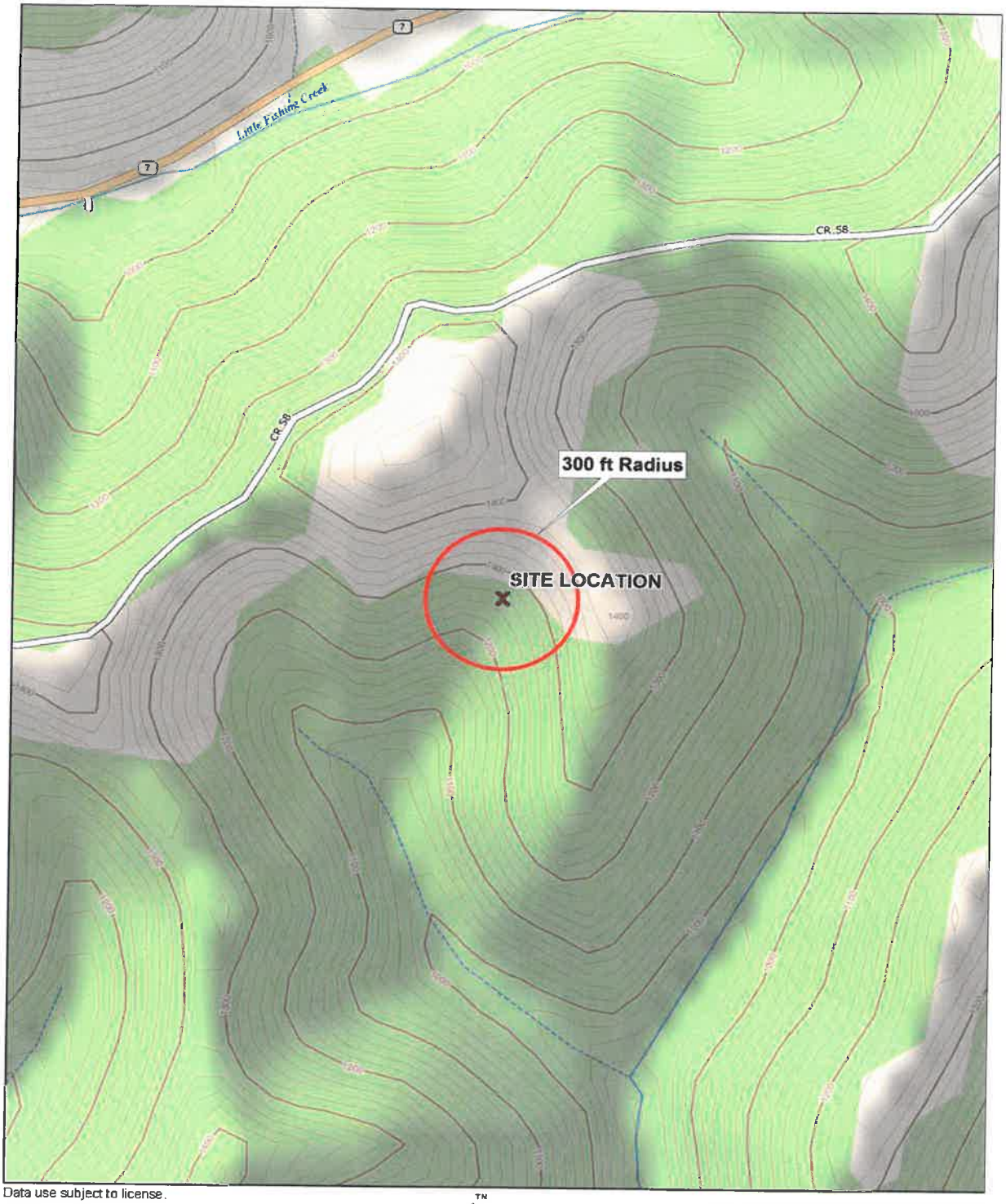
ASCENT RESOURCES - MARCELLUS, LLC

Given under my hand and the Great Seal of the State of West Virginia on this day of July 9, 2015

Natalie E Tennant

Secretary of State

Attachment B: Map(s)



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www.delorme.com

TN
MN (8.8°W)

ENVIRO CLEAN CARDINAL	FIGURE TITLE: **AREA MAP**
1015 N. Broadway, Suite 300 Oklahoma City, OK 73102 (405) 842-1066	DOCUMENT TITLE: CLASS II ADMINISTRATIVE UPDATE
www.eccgrp.com	CLIENT: ASCENT RESOURCES – MARCELLUS, LLC
	LOCATION: MARY MILLER FACILITY WETZEL COUNTY, WEST VIRGINA

DATE	5/3/2017
SCALE	AS SHOWN
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	ARMAWV0001
ATTACHMENT	B

Attachment C: Installation and Start-Up Schedule

Installation and Start-up Schedule

Equipment	Unit ID	Installation Date	Startup Date
WSG-1068 6.8L Generator (189 Hp)	E022A	2017	2017
Gas Production Unit (1.50 MMBtu/hr)	E001	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	E002	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	E003	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	E004	2015	2015
Line Heater (1.50 MMBtu/hr)	E005	2015	2015
Line Heater (1.50 MMBtu/hr)	E006	2015	2015
Line Heater (1.50 MMBtu/hr)	E007	2015	2015
Line Heater (1.50 MMBtu/hr)	E008	2015	2015
Line Heater (1.50 MMBtu/hr)	E023	2016	2016
Flash Separator Heater (1.00 MMBtu/hr)	E009	2015	2015
Condensate Storage Tank (400-bbl)	E011	2015	2015
Condensate Storage Tank (400-bbl)	E012	2015	2015
Condensate Storage Tank (400-bbl)	E013	2015	2015
Produced Water Storage Tank (400-bbl)	E014	2015	2015
Produced Water Storage Tank (400-bbl)	E015	2015	2015
Produced Water Storage Tank (400-bbl)	E016	2015	2015
Enclosed Combustor (18.42 MMBtu/hr)	E019	2015	2015
Condensate Truck Loading	E020	2015	2015
Produced Water Truck Loading	E021	2015	2015
Gas Buster Tank (100-bbl)	E024	2016	2016
Sitewide Fugitive	E025	2015	2015
Unpaved Road Sources	E026	2015	2015

Attachment D: Regulatory Discussion

Applicable State Requirements

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

Ascent is submitting this application in accordance with this rule and will comply will all requirements of this rule.

Applicable Federal Requirements

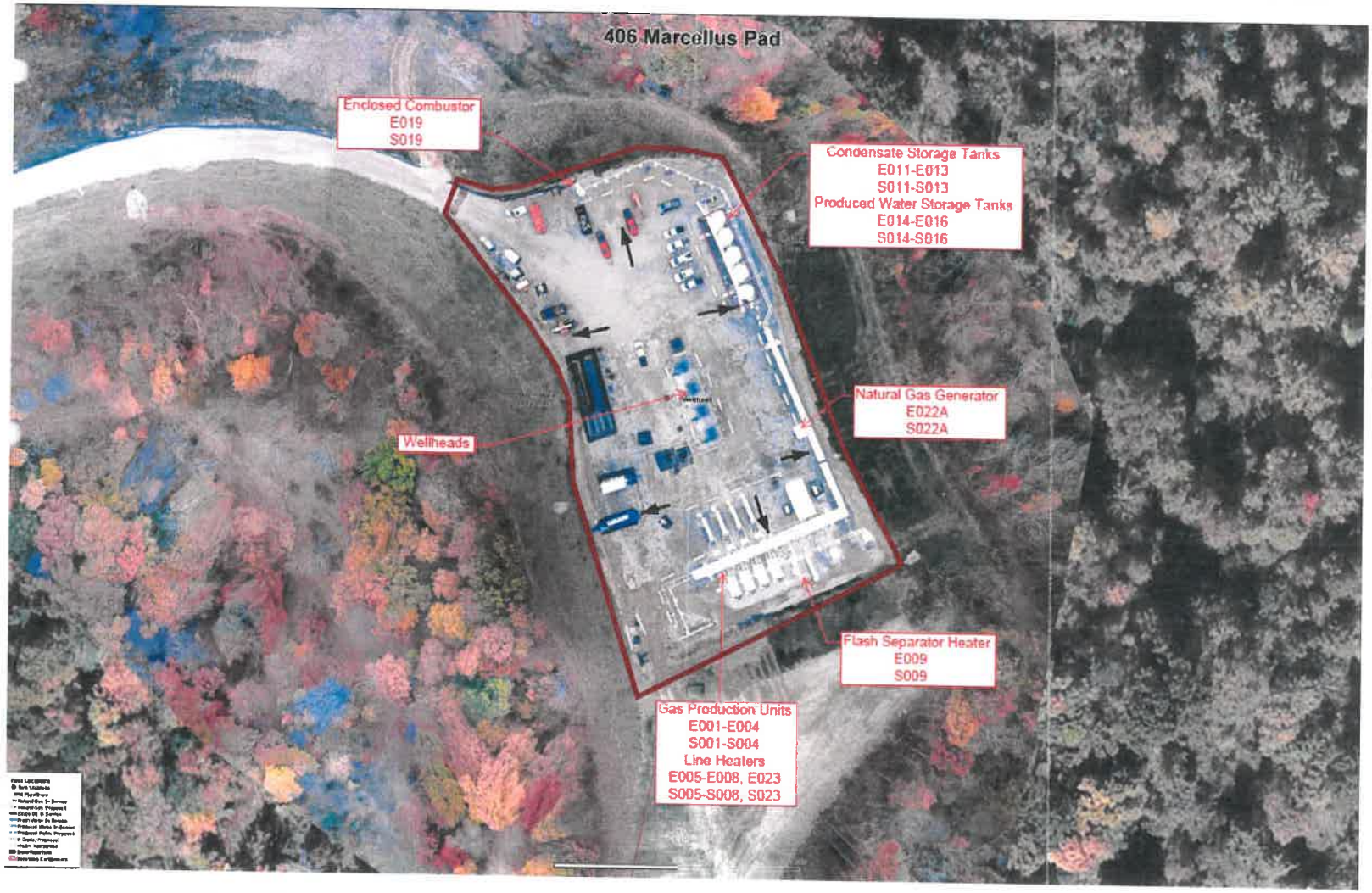
40 CFR PART 60 NSPS SUBPART JJJJ

The natural gas-fired generator (E022A), which is rated at 189 horsepower (Hp), was manufactured and constructed after July 1, 2008. Therefore, the Facility is subject to NSPS Subpart JJJJ and NESHAP Subpart ZZZZ. Specifically, E022A is subject to the emission limitations of Table 4 of the preamble to the final rule for NSPS Subpart JJJJ as published in the Federal Register dated January 18, 2008. In accordance with the rule, Ascent will maintain documentation from the manufacturer that E022A is certified to meet the applicable emission limitations.

40 CFR PART 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) SUBPART ZZZZ

NESHAP Subpart ZZZZ has no additional requirements for area sources. Ascent is complying with NESHAP Subpart ZZZZ by complying with NSPS Subpart JJJJ for E022A.

Attachment E: Plot Plan



ENVIRO CLEAN CARDINAL

1015 N. BROADWAY
SUITE 300
OKLAHOMA CITY, OK 73102
www.eccgrp.com

FIGURE TITLE
PLOT PLAN

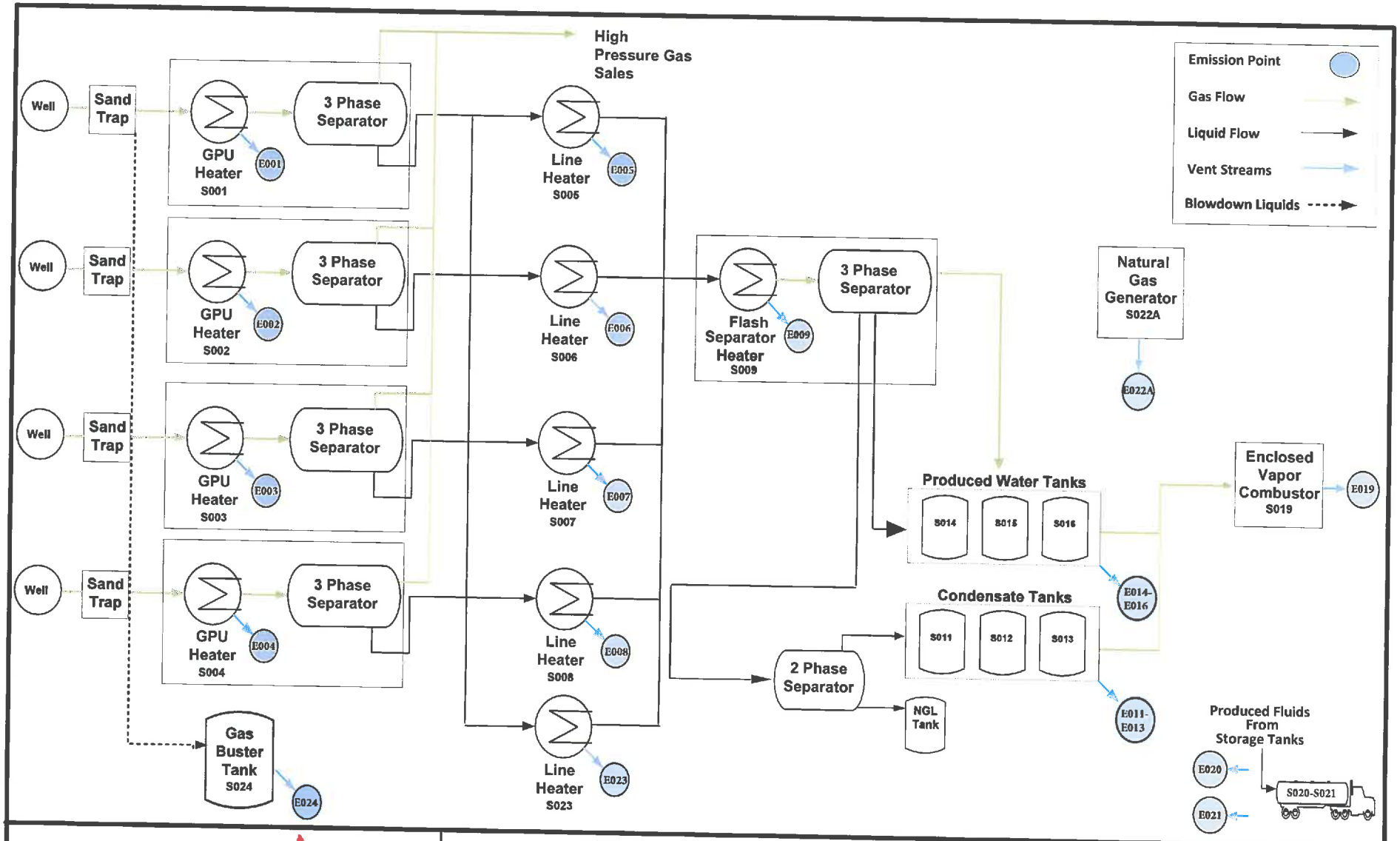
DOCUMENT TITLE
CLASS II ADMINISTRATIVE UPDATE APPLICATION

CLIENT
ASCENT RESOURCES, LLC

LOCATION
MARY MILLER FACILITY
WETZEL COUNTRY, WEST VIRGINIA

DATE	5/3/2017
SCALE	NOT TO SCALE
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	
ARMAWV0001	
ATTACHMENT	
E	

Attachment F: Detailed Process Flow Diagram(s)



ENVIRO CLEAN CARDINAL
1015 N. BROADWAY
SUITE 300
OKLAHOMA CITY, OK 73102
www.eccgrp.com

FIGURE TITLE
PROCESS FLOW DIAGRAM

DOCUMENT TITLE
RULE 13 CONSTRUCTION APPLICATION

CLIENT
ASCENT RESOURCES, LLC

LOCATION
MARY MILLER FACILITY
WETZEL COUNTY, WEST VIRGINIA

DATE	10/21/2016
SCALE	NOT TO SCALE
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	ARMAWV0001
FIGURE NUMBER	F

Attachment G: Process Description

Process Description

In this application, Ascent is removing one (1) natural gas-fired generator and replacing it with one (1) natural gas-fired generator. All other emissions sources are the same as represented in Permit R13-3349.

Natural gas, condensate, and produced water flow from the four (4) wellheads located on the Mary Miller Facility. The inlet streams are first routed through the four (4) 1.5 MMBtu/hr gas production units (GPUs) (E001-E004) where the first stage of fluid separation occurs. The GPUs separate the well stream flow into a high pressure natural gas sales stream and condensate liquid stream. In the second stage of separation, the liquid streams are routed through five (5) 1.5 MMBtu/hr line heaters (E005-E008, E023) to aid in the downstream separation process.

The fluids are then routed to the 1.0 MMBtu/hr low pressure flash separator (E009) where condensate and produced water are separated. The flash from the low pressure separator is sent to the storage tanks, which are controlled by an enclosed combustor (E019). Produced water from the flash separator is routed to three (3) 400-bbl produced water storage tanks (E014-E016). The condensate from the flash separator is routed to the three (3) 400-bbl condensate storage tanks (E011-E013).

The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water are transported offsite via tank truck (E020 and E021). If needed, the condensate and produced water loading may be vapor balanced to the tanks and controlled by the enclosed combustion device (E019). In order to remain conservative, calculations do not include loading controls. Flashing, working, and breathing, emissions from the three (3) 400-bbl produced water storage tanks and three (3) 400-bbl condensate storage tanks will be routed to the enclosed combustion device (E019).

One (1) 189 hp WSG-1068 6.8L natural gas-fired generator (E022A) is located on-site for facility electrical generation. The site also has a gas buster tank (E024) on-site to collect sand and other solids during blowdown from production equipment, and emissions remain unchanged from previous application.

Attachment H: Material Safety Data Sheets (MSDS)

Natural Gas Liquids

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Natural Gas Liquids
SDS Number:	786340
Synonyms/Other Means of Identification:	Natural Gas Liquids, Raw Natural Gas Liquids, Ethane Free Plant Condensate Raw NGL EPBC Mix PBC Mix Y-Grade Gas Liquids
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification
H224 – Flammable liquids – Category 1
H315 – Skin corrosion/irritation – Category 2
H304 – Aspiration Hazard – Category 1
H336 – Specific target organ toxicity (single exposure) – Category 3
H350 – Carcinogenicity – Category 1B
H411 – Hazardous to the aquatic environment, chronic toxicity – Category 2

Hazards not Otherwise Classified
May contain or release poisonous hydrogen sulfide gas

Label Elements

DANGER
Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May contain or release poisonous hydrogen sulfide gas
May be fatal if swallowed and enters airways. (H304)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. (P303+P361+P353)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Store in a well-ventilated place. Keep cool.(P403+P235)*
Store locked up. (P405)*
Dispose of contents/container to approved disposal facility. (P501)*

** (Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration[1]
Natural gas (petroleum), raw liq. mix	64741-48-6	100
n-Hexane	110-54-3	5-25
Benzene	71-43-2	0.1-5
Hydrogen Sulfide	7783-06-4	<1

Total Sulfur: > 0.5 wt%

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% $NaNO_2$ solution (0.5 gm $NaNO_2$ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. May contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H2S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. May contain or release dangerous levels of hydrogen sulfide. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors or mists. Use only outdoors or in well-ventilated area. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural gas (petroleum), raw liq. mix	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m^3 TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
n-Hexane	TWA: 50 ppm Skin	TWA: 500 ppm TWA: 1800 mg/m^3	—
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	—
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Colorless
Physical Form:	Liquid
Odor:	Gasoline; Rotten egg / sulfurous
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	150 - 200 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	No data
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	(estimated) 0.5 - 0.7 @ 68°F / 20°C
Percent Volatile:	100%
Evaporation Rate (nBuAc=1):	No data
Flash Point:	< -99 °F / < -73 °C
Test Method:	(estimate)
Lower Explosive Limits (vol % in air):	No data
Upper Explosive Limits (vol % in air):	No data
Auto-ignition Temperature:	No data

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation	May contain or release poisonous hydrogen sulfide gas - see Other Comments.	> 5.2 mg/L (vapor)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer Based on component information.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Information on Toxicological Effects of Components

Natural gas (petroleum), raw liq. mix

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.
Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.
Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Persistence per IOPC Fund definition: Non-Persistent

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)
- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:
If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1; ,
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, I ***or*** II [I if BP < 95° F (35° C); II if BP > 95° F]

Non-Bulk Package Marking:
Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Non-Bulk Package Labeling:
For UN1965: Flammable gas
For UN3295: Flammable liquid

Bulk Package/Placard Marking:
For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - References:
For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315
For UN3295: 49 CFR 173.150; 173.201; 173.243 ***[PG I]***
-or-
49 CFR 173.150; 173.202; 173.242 ***[PG II]***
(Exceptions; Non-bulk; Bulk)

Hazardous Substance: See Section 15 for RQ`s
Emergency Response Guide: ***UN1965*** - 115; ***UN3295*** - 128;
Note: ***The following alternate shipping description order may be used until January 1, 2013:***
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: *Not applicable*
Other shipping description elements may be required for DOT compliance.

International Maritime Dangerous Goods (IMDG)

Shipping Description:
If boiling point is < 20° C shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Propane , Butane), 2.1
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, I ***or*** II (FP° C cc), *[where FP is the material's flash point in degrees C cc.]*
[I if BP < 95° F (35° C); II if BP > 95° F];

Non-Bulk Package Marking:
Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., (Propane, Butane), UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Labels:
For UN1965: Flammable gas
For UN3295: Flammable liquid

Placards/Marking (Bulk):
For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - Non-Bulk:
For UN1965: P200
For UN3295: P001

EMS:
For UN1965: F-D, S-U
For UN3295: F-E, S-D

Note: ***If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.***

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN1965 *or* UN3295

Proper Shipping Name:
For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane)
For UN3295: Hydrocarbons, liquid, n.o.s.

Hazard Class/Division:
For UN1965: 2.1
For UN3295: 3

Subsidiary risk: None

Packing Group:
For UN1965: None
For UN3295: I *or* II ***[Determined by IATA 3.3.2]***

Non-Bulk Package Marking:
For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane), UN1965
For UN3295: Hydrocarbons, liquid, n.o.s., UN3295

Labels:
For UN1965: Flammable gas , Cargo Aircraft Only
For UN3295: Flammable liquid

ERG Code: ***For UN1965:*** 10L ***or For UN3295:*** 3H

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	***UN1965*** - Forbidden ***UN3295*** - Forbidden - ***[PG I]*** Y341 - ***[PG II]***	***UN1965*** - *Forbidden* ***UN3295*** - 351 - ***[PG I]*** 353 - ***[PG II]***	***UN1965*** - 200 ***UN3295*** - 361 - ***[PG I]*** 364 - ***[PG II]***
Max. Net Qty. Per Package:	***UN3295*** - Forbidden - ***[PG I]*** 1L - ***[PG II]***	***UN3295*** - 1L - ***[PG I]*** 5 L - ***[PG II]***	***UN1965*** - 150 kg ***UN3295*** - 30 L - ***[PG I]*** 60 L - ***[PG II]***

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
n-Hexane	5-25	1.0%
Toluene	1-5	1.0%
Benzene	0.1-5	0.1%
Cyclohexane	0-3	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:
Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
B2 - Flammable Liquids
D2A
D2B

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4)Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	786340

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
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Crude Condensate

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Crude Condensate
SDS Number:	730370
Synonyms/Other Means of Identification:	Natural Gas Condensates, Petroleum Crude Oil Condensate Gas Drips
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascent resources.com

Section 2: Hazard(s) Identification

Classification

H224 -- Flammable liquids -- Category 1
H304 -- Aspiration Hazard -- Category 1
H315 -- Skin corrosion/irritation -- Category 2
H332 -- Acute toxicity, Inhalation -- Category 4
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Hazards not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements

DANGER

Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May be fatal if swallowed and enters airways. (H304)*
Contains poisonous hydrogen sulfide gas
Harmful if inhaled. (H332)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Keep cool. (P235)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Avoid release to the environment. (P273)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. (P361)* Wash with plenty of soap and water. (P352)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

* *(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration[1]
Natural Gas Condensate ..C2-20	64741-47-5	100
Toluene	108-88-3	1-7
Hydrogen Sulfide	7783-06-4	0.1-5
Benzene	71-43-2	<5

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): Immediately move victim away from exposure and into fresh air in a position comfortable for breathing. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% $NaNO_2$ solution (0.5 gm $NaNO_2$ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 2 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Contains poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H2S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Wear protective gloves/clothing and eye/face protection. May contain or release dangerous levels of hydrogen sulfide. Use only outdoors or in well-ventilated area. Avoid breathing vapors or mists. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas, and condensates. Production and processing of these materials can lead to "drop-out" of elemental mercury in enclosed vessels and pipe work, typically at the low point of any process equipment because of its density. Mercury may also occur in other process system deposits such as sludges, sands, scales, waxes, and filter media. Personnel engaged in work with equipment where mercury deposits might occur (confined space entry, sampling, opening drain valves, draining process lines, etc), may be exposed to a mercury hazard (see sections 3 and 8).

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural Gas Condensate ..C2-20	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m^3 TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
Toluene	TWA: 20 ppm	Ceiling: 300 ppm TWA: 200 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in processing vessels and equipment presenting the possibility of exposure during various sampling and maintenance operations. Implement appropriate respiratory protection and the use of other protective equipment as dictated by monitoring results (See Sections 2 and 7).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Amber to dark brown
Physical Form:	Liquid
Odor:	Rotten egg / sulfurous; Petroleum.
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	5-15 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	1
Initial Boiling Point/Range:	-20 to 800 °F / -29 to 427 °C
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	0.6 - 0.8 @ 60°F (15.6°C)
Bulk Density:	6.25 lbs/gal
VOC Content(%):	50
Evaporation Rate (nBuAc=1):	1
Flash Point:	-51 °F / -46 °C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Lower Explosive Limits (vol % in air):	1.1
Upper Explosive Limits (vol % in air):	6.0
Auto-ignition Temperature:	590 °F / 310 °C

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Harmful if inhaled	Contains poisonous hydrogen sulfide gas. See Signs and Symptoms.	10 mg/L (vapor, estimated)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

This material contains hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Information on Toxicological Effects of Components

Natural Gas Condensate ..C2-20

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

Xylenes

Target Organs: Rats exposed to xylenes at 800, 1000 or 1200 ppm 14 hours daily for 6 weeks demonstrated high frequency hearing loss. Another study in rats exposed to 1800 ppm 8 hours daily for 5 days demonstrated middle frequency hearing loss.

Reproductive Toxicity: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions, but no evidence of teratogenicity.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Ethyl Benzene
Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC.
Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilio foci, hypertrophy, necrosis), lung (alveolar epithelium metaplasia), thyroid (hyperplasia), thyroid (hyperplasia) and pituitary (hyperplasia). In animal models (particularly rats), ethyl benzene affects the auditory function mainly in the cochlear mid-frequency range and ototoxicity was observed after combined exposure to noise and ethyl benzene. There is no evidence of either ethyl benzene-induced hearing losses or ototoxicity with combined exposure to ethyl benzene and noise in workers.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)
- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:
UN3160, Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide; ,; Liquefied Petroleum Gas), 2.3,; , (2.1), Inhalation Hazard Zone ***X***
If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1267, Petroleum crude oil, 3, I ***or*** II [**I** if BP < 35° C (95° F); **II** if BP > 35° C]

Non-Bulk Package Marking:

Must be consistent with shipping description, either:
Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide, Liquefied petroleum gas), UN3160
or
Hydrocarbon gas mixture, liquefied, n.o.s., UN1965
or
Petroleum crude oil, UN1267

Non-Bulk Package Labeling:

For UN3160: Poison gas and Flammable gas
For UN1965: Flammable gas
For UN1267: Flammable liquid

Bulk Package/Placard Marking:

For UN3160: Poison gas / 3160 and Flammable gas
For UN1965: Flammable gas / 1965
For UN1267: Flammable / 1267

Packaging - References:

For UN3160: None; 49 CFR 173.304; 173.314 & .315
For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315
For UN1267: 49 CFR 173.150; 173.201; 173.243 ***[PG I]***
-or-
49 CFR 173.150; 173.202; 173.242 ***[PG II]***
(Exceptions; Non-bulk; Bulk)

Hazardous Substance:

The EPA's Petroleum Exclusion applies to Section 2 and/or 15 components which are listed in 49 CFR 172.101, Table 1 to Appendix A.

Emergency Response Guide:

UN3160 - 119; ***UN1965*** - 115; ***UN1267*** - 128;

Note:

Replace ***X*** in shipping description with:
D if Molar % H2S is from 8.8% to 14.8%
C if Molar % H2S is from 14.9% to 44.4%
B if Molar % H2S is from 44.5% to 100.0%
Container(s) greater than 5 liters (liquids) or 5 kilograms (solids), shipped by water mode and ALL bulk shipments may require the shipping description to contain the "Marine Pollutant" notation [49 CFR 172.203(l)] and the container(s) to display the [Marine Pollutant Mark] [49 CFR 172.322].

The following alternate shipping description order may be used until January 1, 2013:
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Other shipping description elements may be required for DOT compliance.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: *Not applicable*

International Maritime Dangerous Goods (IMDG)

Shipping Description:	***If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:*** UN3160, Liquefied gas, toxic, flammable, n.o.s (Hydrogen sulphide , Liquefied Petroleum Gas), 2.3,; , (2.1) ***If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:*** UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), 2.1; ***If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:*** UN1267, Petroleum crude oil, 3, I ***or*** II [I if IBP < 35° C (95° F); II if IBP > 35° C] (-46° C);
Non-Bulk Package Marking:	***Must be consistent with shipping description, either:*** Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN3160 ***or*** Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN1965 ***or*** Petroleum crude oil, UN1267
Labels:	***For UN3160:*** Toxic gas and Flammable gas ***For UN1965:*** Flammable gas ***For UN1267:*** Flammable liquid
Placards/Marking (Bulk):	***For UN3160:*** Toxic gas / 3160 and Flammable gas ***For UN1965:*** Flammable gas / 1965 ***For UN1267:*** Flammable / 1267
Packaging - Non-Bulk:	***For UN3160 & UN1965:*** P200 ***For UN1267:*** P001
EMS:	***For UN3160 & UN1965:*** F-D, S-U ***For UN1267:*** F-E, S-E
Note:	***If container(s) is greater than 5 liters (liquids) or 5 kilograms (solids), shipment may require the shipping description to contain the "Marine Pollutant" description [IMDG 5.4.1.4.3.5] and the container(s) to display the Marine Pollutant mark [IMDG 5.2.1.6]. U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25. If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.***

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #:	UN3160 - ***Forbidden*** UN1965 ***or*** UN1267
Proper Shipping Name:	***For UN1965:*** Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide) ***For UN1267:*** Petroleum crude oil
Hazard Class/Division:	***For UN1965:*** 2.1 ***For UN1267:*** 3
Subsidiary risk:	None
Packing Group:	***For UN1965:*** None ***For UN1267:*** I ***or*** II ***[Determined by IATA 3.3.2]***
Non-Bulk Package Marking:	***For UN1965:*** Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide), UN1965 ***For UN1267:*** Petroleum crude oil, UN1267
Labels:	***For UN1965:*** Flammable gas , Cargo Aircraft Only ***For UN1267:*** Flammable liquid
ERG Code:	***For UN1965:*** 10L ***or For UN1267:*** 3L

LTD. QTY	**Passenger Aircraft**	**Cargo Aircraft Only**

Packaging Instruction #:	***UN1965*** - Forbidden ***UN1267*** - Forbidden - ***[PG I]*** Y341 - ***[PG II]***	***UN1965*** - *Forbidden* ***UN1267*** - 351 - ***[PG I]*** 353 - ***[PG II]***	***UN1965*** - 200 ***UN1267*** - 361 - ***[PG I]*** 364 - ***[PG II]***
Max. Net Qty. Per Package:	***UN1267*** - None (PG I); 1L (PG II)	***UN1267*** - 1L - ***[PG I]*** 5 L - ***[PG II]***	***UN1965*** - 150 kg ***UN1267*** - 30 L - ***[PG I]*** 60 L - ***[PG II]***

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
Xylenes	1-8	1.0%
Toluene	1-7	1.0%
Cyclohexane	1-5	1.0%
Benzene	<5	0.1%
n-Hexane	2-4	1.0%
Ethyl Benzene	1-3	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:
Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant
Ethyl Benzene	Cancer

International Hazard Classification

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
B2 - Flammable Liquids
D2A
D2B

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4) Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	730370

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

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ASCENT RESOURCES

Produced Brine Water

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Produced Brine Water
SDS Number:	401320
Intended Use:	Process Water
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification

H302 – Harmful if swallowed – Category 1
H319 – Eye damage/irritation – Category 2
H316 – Causes mild skin irritation – Category 1
H332 – Harmful if inhaled – Category 1
H350 – Carcinogenicity – Category 1A
H412 – May cause chronic harmful effects to aquatic life – Category 2

Label Elements

DANGER
Causes serious eye irritation. (H319)*
Harmful if swallowed. (H302)*
Harmful if inhaled. (H332)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H412)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Do not breathe dust/fume/gas/mist/vapours/spray. (P261)
Wash thoroughly after handling. (P264)*
Do not eat, drink, or smoke when using this product. (P270)*
Avoid release to the environment. (P273)*
Use outdoors in a well ventelated space (P271)
Wear protective gloves / protective clothing / eye protection. (P281)*
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338*)
If eye irritation persists: Get medical advice/attention. (P313)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P312)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304 + P340)*
Get medical advice/attention if you feel unwell. (P314)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

** (Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CAS#	Concentration[1]
Water	7732-18-5	80-100%
Sodium chloride	91-20-3	<20%
Benzene	71-43-2	<2%

All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	NIOSH
Water (7732-18-5)	Not established	Not established	Not established
Sodium chloride (7647-14-5)	Not established	Not established	Not established
Benzene (71-43-2)	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 1 ppm	STEL: 5 ppm TWA: 0.1 ppm

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with organic vapor cartridges/canisters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Varies (clear / amber / brown)
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	4.9-8.5
Vapor Pressure:	No data available
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	212 °F / 100 °C
Melting/Freezing Point:	32 °F / 0 °C
Pour Point:	No data
Solubility in Water:	Infinintely
Partition Coefficient (n-octanol/water) (Kow):	>10
Specific Gravity (water=1):	1.0 -1.1 °API
Viscosity:	No data available
Evaporation Rate (nBuAc=1):	No data available
Flash Point:	No data available
Test Method:	Not applicable
Lower Explosive Limits (vol % in air):	1%
Upper Explosive Limits (vol % in air):	46%
Auto-ignition Temperature:	No data available

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing and reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation		No data
Skin Absorption	Unlikely to be harmful		No data
Ingestion (Swallowing)	Unlikely to be harmful		No data

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of hydrocarpon products by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus

Carcinogenicity: May cause cancer, based on component information.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available.

Other Comments: This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Information on Toxicological Effects of Components

Water
Carcinogenicity: No data available
Target Organs: No data available
Reproductive Toxicity: No data available
Germ Cell Mutagenicity: No data available

Sodium chloride
Carcinogenicity: No data available but sodium chloride has not been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.
Target Organs: Eyes, respiratory system, central nervous system
Reproductive Toxicity: No data available
Germ Cell Mutagenicity: No data available

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Section 12: Ecological Information

Toxicity: Not evaluated

Persistence and Degradability: Not evaluated

Persistence per IOPC Fund definition: Not evaluated

Bioaccumulative Potential: Not evaluated although the solubility and log KOW would indicate it has little bioaccumulative potential.

Mobility in Soil: Not evaluated although the solubility properties indicate produced water would be highly mobile throughout a system.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping name: ***Not regulated***

Note: Some states may require specific shipping lables. Contact each jurisdiction for more information.

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
Benzene	<2	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

Warning: This material may contain detectable quantities of the following chemicalsidentified on federal and individual state hazardouis substances list. Contact each jurisdiction for more information.

Component	Type of Toxicity
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification:

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
D2A
D2B

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue: 1-Sep-2015
Status: FINAL

Revised Sections or Basis for Revision:

Identified Hazards (Section 2)
Precautionary Statement(s) (Section 2)
First Aid (Section 4)
Shipping information (Section 14)
Regulatory information (Section 15)

SDS Number: 401320

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

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Attachment I: Emission Units Table

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
S001	E001	Gas Production Unit	2015	1.50 MMBtuH	No Change	N/A
S002	E002	Gas Production Unit	2015	1.50 MMBtuH	No Change	N/A
S003	E003	Gas Production Unit	2015	1.50 MMBtuH	No Change	N/A
S004	E004	Gas Production Unit	2015	1.50 MMBtuH	No Change	N/A
S005	E005	Line Heater	2015	1.50 MMBtuH	No Change	N/A
S006	E006	Line Heater	2015	1.50 MMBtuH	No Change	N/A
S007	E007	Line Heater	2015	1.50 MMBtuH	No Change	N/A
S008	E008	Line Heater	2015	1.50 MMBtuH	No Change	N/A
S009	E009	Flash Separator Heater	2015	1.00 MMBtuH	No Change	N/A
S011	E011	Tank 1 - Condensate Storage Tank	2015	400-bbl	No Change	E019
S012	E012	Tank 2 - Condensate Storage Tank	2015	400-bbl	No Change	E019
S013	E013	Tank 3 - Condensate Storage Tank	2015	400-bbl	No Change	E019
S014	E014	Tank 4 - Prod. Water Storage Tank	2015	400-bbl	No Change	E019
S015	E015	Tank 5 - Prod. Water Storage Tank	2015	400-bbl	No Change	E019
S016	E016	Tank 6 - Prod. Water Storage Tank	2015	400-bbl	No Change	E019
S019	E019	Enclosed Combustor	2015	18.42 MMBtuH	No Change	N/A
S020	E020	Condensate Truck Loading	2015	N/A	No Change	N/A
S021	E021	Produced Water Truck Loading	2015	N/A	No Change	N/A
S022	E022	HiPower PSI/GM 3.0L Generator	2015	47 hp	Removal	N/A
S022A	E022A	WSG-1068 6.8L Generator	2017	189 hp	New	N/A
S023	E023	Line Heater	2016	1.50 MMBtuH	No Change	N/A
S024	E024	Gas Buster Tank	2016	100-bbl	No Change	N/A
S025	E025	Sitewide Fugitive	2015	N/A	No Change	N/A
S026	E026	Unpaved Road Sources	2015	N/A	No Change	N/A

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J: Emission Points Data Summary Sheet

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m[4])
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E001	Horizontal Stack	E001	S001	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E002	Horizontal Stack	E002	S002	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E003	Horizontal Stack	E003	S003	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E004	Horizontal Stack	E004	S004	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m[4])
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E005	Horizontal Stack	E005	S005	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E006	Horizontal Stack	E006	S006	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E007	Horizontal Stack	E007	S007	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E008	Horizontal Stack	E007	S007	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m[4])
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E009	Horizontal Stack	E009	S009	N/A	N/A	C	8760	VOC NOx CO PM SO2	0.01 0.10 0.08 0.01 <0.01	0.02 0.43 0.36 0.03 <0.01	0.01 0.10 0.08 0.01 <0.01	0.02 0.43 0.36 0.03 <0.01	Gas/Vapor	EE	
E023	Horizontal Stack	E023	S023	N/A	N/A	C	8760	VOC NOx CO PM SO2	0.01 0.15 0.12 0.01 <0.01	0.04 0.64 0.54 0.05 <0.01	0.01 0.15 0.12 0.01 <0.01	0.04 0.64 0.54 0.05 <0.01	Gas/Vapor	EE	
E011	Vent / Combustor Vertical Stack	E011	S011	E019	Enclosed Combustor	C	8760	VOC	--	100.05	--	2.00	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E012	Vent / Combustor Vertical Stack	E012	S012	E019	Enclosed Combustor	C	8760	VOC	--	100.05	--	2.00	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E013	Vent / Combustor Vertical Stack	E013	S013	E019	Enclosed Combustor	C	8760	VOC	--	100.05	--	2.00	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E014	Vent / Combustor Vertical Stack	E014	S014	E019	Enclosed Combustor	C	8760	VOC	--	0.29	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E015	Vent / Combustor Vertical Stack	E015	S015	E019	Enclosed Combustor	C	8760	VOC	--	0.29	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E016	Vent / Combustor Vertical Stack	E016	S016	E019	Enclosed Combustor	C	8760	VOC	--	0.29	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E019	Enclosed Combustor	E019	S019	N/A	N/A	C	8760	NOx VOC CO	1.25 1.35 6.82	5.49 5.90 29.85	1.25 1.35 6.82	5.49 5.90 29.85	Gas/Vapor	EE	
E020	Truck Vent	E011, E012, E013	S011, S012, S013	N/A	N/A	C	8760	VOC	58.95	3.11	58.95	3.11	Gas/Vapor	EE	

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
E021	Truck Vent	E014, E015, E016	S014, S015, S016	N/A	N/A	C	8760	VOC	0.59	0.22	0.59	0.22	Gas/Vapor	EE	
E022A	Vertical Stack	E022A	S022A	N/A	N/A	C	8760	VOC NOx CO PM SO2	0.29 0.42 0.83 0.01 <0.01	1.28 1.83 3.65 0.04 <0.01	0.29 0.42 0.83 0.01 <0.01	1.28 1.83 3.65 0.04 <0.01	Gas/Vapor	EE	
E025	Fugitive	E025	S025	N/A	N/A	C	8760	VOC	2.13	9.27	2.13	9.27	Gas/Vapor	EE	
E026	Fugitive	E026	S026	N/A	N/A	C	8760	PM(total)	1.11	4.86	1.11	4.86	Solid	EE	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

2 Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
E001	N/A	N/A	N/A	N/A	1184	10	4385087	533150
E002	N/A	N/A	N/A	N/A	1184	10	4385092	533150
E003	N/A	N/A	N/A	N/A	1184	10	4385097	533150
E004	N/A	N/A	N/A	N/A	1184	10	4385102	533150
E005	N/A	N/A	N/A	N/A	1184	10	4385107	533150
E006	N/A	N/A	N/A	N/A	1184	10	4385112	533150
E007	N/A	N/A	N/A	N/A	1184	10	4385117	533150
E008	N/A	N/A	N/A	N/A	1184	10	4385122	533150
E009	N/A	N/A	N/A	N/A	1184	10	4385127	533150
E011	N/A	N/A	N/A	N/A	1184	20	4385137	533150
E012	N/A	N/A	N/A	N/A	1184	20	4385142	533150
E013	N/A	N/A	N/A	N/A	1184	20	4385147	533150
E014	N/A	N/A	N/A	N/A	1184	20	4385152	533150
E015	N/A	N/A	N/A	N/A	1184	20	4385157	533150
E016	N/A	N/A	N/A	N/A	1184	20	4385162	533150
E019	0.75	1400-2100	N/A	N/A	1184	25	4385167	533150
E020	N/A	N/A	N/A	N/A	1184	N/A	4385172	533150

E021	N/A	N/A	N/A	N/A	1184	N/A	4385177	533150
E022A	0.167	1,350	1,507	1,151.3	1184	9	4385182	533150
E023	N/A	N/A	N/A	N/A	1184	10	4385187	533150
E024	N/A	N/A	N/A	N/A	1184	7.5	4385192	533150
E025	N/A	N/A	N/A	N/A	1184	N/A	4385197	533150
E026	N/A	N/A	N/A	N/A	1184	N/A	4385202	533150

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment L: Emissions Unit Data Sheet(s)

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): E022A

1. Name or type and model of proposed affected source:

   One (1) WSG-1068 6.8L Natural Gas-Fired Generator (189 hp)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   N/A

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Per Unit:
   0.29 lb/hr VOC
   0.42 lb/hr NOx
   0.83 lb/hr CO
   0.01 lb/hr PM

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   N/A

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural Gas: 2,554 Btu/hp-hr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

See Attachment N, Table 6.

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

189 hp

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ N/A °F and psia

a.	NO_X	0.42 lb/hr	grains/ACF
b.	SO_2	lb/hr	grains/ACF
c.	CO	0.83 lb/hr	grains/ACF
d.	PM_{10}	0.01 lb/hr	grains/ACF
e.	Hydrocarbons	lb/hr	grains/ACF
f.	VOCs	0.29 lb/hr	grains/ACF
g.	Pb	lb/hr	grains/ACF
h.	Specify other(s)		
	Formaldehyde	0.01 lb/hr	grains/ACF
	Acetaldehyde	0.001 lb/hr	grains/ACF
	Acrolein	0.001 lb/hr	grains/ACF
	Methanol	0.001 lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
N/A	N/A
REPORTING	**TESTING**
N/A	N/A- Engine is certified. Certificate of Conformity is included in this application.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

WSG-1068

6.8-LITRE 10-CYLINDER

eNGines-LPG

Specifications

Engine Type...	V-10
Bore and Stroke	3.55"x 4.17" (90.2mm x 105.8mm)
Displacement	6.8 Litre (415 CID)
Compression Ratio	9:1
Oil Capacity	6 qts. including filter (4.26 litres)
Net Weight	640 Lbs. (290 Kgs.)
Base Engine Dimensions	H 30.4" x L 28.5" x W 31.7" (772.6 mm x 723.5 mm x 805.1 mm)

Natural Gas (corrected per SAE J1995)

Fuel Specification	1050 BTU/FT3
Intermittent Power	210 [HP] @ 3200rpm (156 [kW] @ 3200rpm)
Continuous power	189 [HP] @ 3200rpm (141 [kW] @ 3200rpm)
Intermittent Torque	329 [ft-lbs] @3200rpm (446 [N-m] @ 3200rpm)
Continuous Torque	298 [ft-lbs] @3200rpm (404 [N-m] @ 3200rpm)

Liquefied Petroleum Gas (corrected per SAE J1995)

Fuel Specification	HD-5
Intermittent Power	230 [HP] @ 3200rpm (171 [kW] @ 3200rpm)
Continuous power	206 [HP] @ 3200rpm (153 [kW] @ 3200rpm)
Intermittent Torque	370 [ft-lbs] @3200rpm (501 [N-m] @ 3200rpm)
Continuous Torque	330 [ft-lbs] @3200rpm (447 [N-m] @ 3200rpm)

Options

Lifting Eyes

Flywheels
- 11.5" (292.1 mm) over-center
- 12.0" (304.8 mm) flat-faced

Flywheel Housings
- SAE #3 with feet, without side mounting pads

Clutch
- 12.0" (304.8 mm) spring loaded

Generator
- 12V 110 AMP

Stainless Steel Exhaust Manifolds

Starter

FEAD with Single Serpentine Belt

Engine Cooling Fans
- Suction
- Pusher

Wiring Harnesses

Engine Mounts

Electronic Instrument Panel, Gauges

Three Way Catalyst / Muffler

Emissions Information

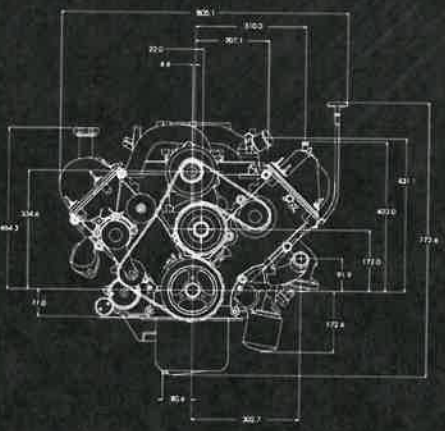
Environmental Protection Agency (EPA) Emission Certified Packages Available.

Warranty

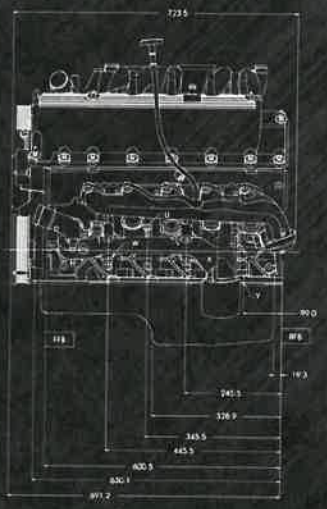
Go to **www.eNGines-LPG.com/warranty** for warranty details.

Dimensions

Front End View



Left Side View



Ford Power Products

Powertrain Assemblies & Components Provided By Ford Component Sales

eNGines-LPG
10 N. Main St. Ste A, Munroe Falls, OH 44262
888-717-8025 Fax 817-764-1145
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2016 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Graham Ford Power Products**
(U.S. Manufacturer or Importer)

Certificate Number: **GGRHB06.8WNG-002**

Effective Date: 10/23/2015

Expiration Date: 12/31/2016

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 10/23/2015

Revision Date: N/A

Manufacturer: Graham Ford Power Products
Engine Family: GGRHB06.8WNG
Mobile/Stationary Certification Type: Mobile and Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards :
Mobile Part 1048
NMHC + NOx (g/kW-hr) : 2.7
HC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
Stationary Part 1048
CO (g/kW-hr) : 4.4
NMHC + NOx (g/kW-hr) : 2.7
HC + NOx (g/kW-hr) : 2.7
Part 60 Subpart JJJ Table 1
CO (g/kW-hr) : 2.7
VOC (g/kW-hr) : 0.9
NOx (g/kW-hr) : 1.3
Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 1048, 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 1048, 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1048, 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1048, 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1048, 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 1048, 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Attachment N: Supporting Emissions Calculations

TABLE 1

UPDATED FACILITY-WIDE POTENTIAL CRITERIA POLLUTANT EMISSIONS SUMMARY
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Existing Emissions Source	Emission Point Identification	Criteria Pollutants [1]									
		NO_X		VOC		CO		PM		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
HiPower PSI/GM 3.0L Generator (47 Hp)	E022 [2]	0.29	1.27	0.01	0.05	0.50	2.18	0.01	0.03	0.02	0.07
Gas Production Unit (1.50 MMBtu/hr)	E001 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E002 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E003 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E004 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E005 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E006 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E007 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E008 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Flash Separator Heater (1.00 MMBtu/hr)	E009 [2]	0.10	0.43	0.01	0.02	0.08	0.36	0.01	0.03	0.002	0.01
Line Heater (1.50 MMBtu/hr)	E023 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Condensate Storage Tank (400-bbl)	E011 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Condensate Storage Tank (400-bbl)	E012 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Condensate Storage Tank (400-bbl)	E013 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E014 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E015 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E016 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Enclosed Combustor (18.42 MMBtu/hr)	E019 [2]	1.25	5.49	1.35	5.90	6.82	29.85	—	—	—	—
Condensate Truck Loading	E020 [2]	—	—	58.95	3.11	—	—	—	—	0.02	0.001
Produced Water Truck Loading	E021 [2]	—	—	0.59	0.22	—	—	—	—	0.001	0.001
Gas Buster Tank (100-bbl)	E024 [2]	—	—	17.28	3.15	—	—	—	—	4.26	0.78
Fugitive VOC Emissions	E025 [2]	—	—	2.13	9.27	—	—	—	—	0.01	0.03
Previously Permitted Emissions		**2.99**	**12.95**	**80.41**	**28.11**	**8.48**	**37.25**	**0.11**	**0.51**	**4.33**	**1.00**

Emissions Source	Emission Point Identification	Criteria Pollutants [1]									
		NO_X		VOC		CO		PM		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
WSG-1068 6.8L Generator (189 Hp)	E022A [3]	0.42	1.83	0.29	1.28	0.83	3.65	0.01	0.04	0.02	0.07
Gas Production Unit (1.50 MMBtu/hr)	E001 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E002 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E003 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E004 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E005 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E006 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E007 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E008 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Flash Separator Heater (1.00 MMBtu/hr)	E009 [2]	0.10	0.43	0.01	0.02	0.08	0.36	0.01	0.03	0.002	0.01
Line Heater (1.50 MMBtu/hr)	E023 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Condensate Storage Tank (400-bbl)	E011 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Condensate Storage Tank (400-bbl)	E012 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Condensate Storage Tank (400-bbl)	E013 [2]	—	—	—	2.00	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E014 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E015 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Produced Water Storage Tank (400-bbl)	E016 [2]	—	—	—	0.01	—	—	—	—	—	0.001
Enclosed Combustor (18.42 MMBtu/hr)	E019 [2]	1.25	5.49	1.35	5.90	6.82	29.85	—	—	—	—
Condensate Truck Loading	E020 [2]	—	—	58.95	3.11	—	—	—	—	0.02	0.001
Produced Water Truck Loading	E021 [2]	—	—	0.59	0.22	—	—	—	—	0.001	0.001
Gas Buster Tank (100-bbl)	E024 [2]	—	—	17.28	3.15	—	—	—	—	4.26	0.78
Fugitive VOC Emissions	E025 [2]	—	—	2.13	9.27	—	—	—	—	0.01	0.03
Total Modified Emissions		**3.12**	**13.51**	**80.69**	**29.34**	**8.81**	**38.72**	**0.11**	**0.52**	**4.33**	**1.00**
Difference (Modified Less Permitted)		**0.13**	**0.56**	**0.28**	**1.23**	**0.33**	**1.47**	**0.00**	**0.01**	**0.000**	**0.000**

Notes:

1. Emissions of SO2 are assumed to be negligible since pipeline-quality natural gas is used as fuel. Refer to Table 2 for HAP emissions, Table 3 for road emissions, and Table 4 for GHG emissions.
2. Emissions as represented in Permit R13-3349, issued April 10, 2017.
3. Refer to Table 5 for engine potential emissions calculations.

TABLE 2

UPDATED FACILITY-WIDE POTENTIAL HAP EMISSIONS SUMMARY
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Existing Emissions Source	Emission Point Identification	Hazardous Air Pollutants [1]																	
		Formaldehyde		Acetaldehyde		Acrolein		Methanol		n-Hexane		Benzene		Toluene		Xylene		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
WSG-1068 6.8L Generator (189 Hp)	E022 [2]	0.01	0.04	0.003	0.01	0.002	0.01	0.001	0.005	0.001	0.002	0.0002	0.001	0.0002	0.001	0.0001	0.0003	0.02	0.07
Gas Production Unit (1.50 MMBtu/hr)	E001 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E002 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E003 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E004 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E005 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E006 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E007 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E008 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Flash Separator Heater (1.00 MMBtu/hr)	E009 [2]	0.0001	0.0003	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E023 [2]	0.0001	0.001	—	—	—	—	—	—	0.002	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.002	0.01
Condensate Storage Tank (400-bbl)	E011 [2]	—	—	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Condensate Storage Tank (400-bbl)	E012 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Condensate Storage Tank (400-bbl)	E013 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E014 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E015 [2]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E016 [2]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Enclosed Combustor (18.42 MMBtu/hr)	E019 [3]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Condensate Truck Loading	E020 [2]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Produced Water Truck Loading	E021 [2]	—	—	—	—	—	—	—	—	0.01	0.001	0.002	0.0001	0.001	0.0001	0.0001	0.0001	0.02	0.001
Gas Buster Tank (100-bbl)	E024 [2]	—	—	—	—	—	—	—	—	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001	0.001
Fugitive VOC Emissions	E025 [2]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.26	0.78
Previously Permitted Emissions		**0.01**	**0.04**	**0.003**	**0.01**	**0.002**	**0.01**	**0.001**	**0.005**	**0.05**	**0.13**	**0.003**	**0.004**	**0.004**	**0.01**	**0.001**	**0.002**	**4.33**	**1.00**

Emissions Source	Emission Point Identification	Hazardous Air Pollutants [1]																	
		Formaldehyde		Acetaldehyde		Acrolein		Methanol		n-Hexane		Benzene		Toluene		Xylene		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
WSG-1068 6.8L Generator (189 Hp)	E022A [3]	0.01	0.04	0.001	0.01	0.001	0.01	0.002	0.01	—	—	0.001	0.003	0.0003	0.001	0.0001	0.0004	0.02	0.07
Gas Production Unit (1.50 MMBtu/hr)	E001 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E002 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E003 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	E004 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E005 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E006 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E007 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E008 [2]	0.0001	0.001	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Flash Separator Heater (1.00 MMBtu/hr)	E009 [2]	0.0001	0.0003	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Line Heater (1.50 MMBtu/hr)	E023 [2]	0.0001	0.001	—	—	—	—	—	—	0.002	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.002	0.01
Condensate Storage Tank (400-bbl)	E011 [2]	—	—	—	—	—	—	—	—	0.003	0.01	0.0001	0.0001	0.0001	0.0001	—	—	0.003	0.01
Condensate Storage Tank (400-bbl)	E012 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Condensate Storage Tank (400-bbl)	E013 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E014 [2]	—	—	—	—	—	—	—	—	—	0.0004	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E015 [2]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (400-bbl)	E016 [2]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Enclosed Combustor (18.42 MMBtu/hr)	E019 [3]	—	—	—	—	—	—	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.0001	—	0.001
Condensate Truck Loading	E020 [3]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Produced Water Truck Loading	E021 [3]	—	—	—	—	—	—	—	—	0.01	0.001	0.002	0.0001	0.001	0.0001	0.0001	0.0001	0.02	0.001
Gas Buster Tank (100-bbl)	E024 [2]	—	—	—	—	—	—	—	—	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001	0.001
Fugitive VOC Emissions	E025 [2]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.26	0.78
Total Modified Emissions		**0.01**	**0.05**	**0.001**	**0.01**	**0.001**	**0.01**	**0.002**	**0.01**	**0.04**	**0.13**	**0.004**	**0.008**	**0.004**	**0.01**	**0.001**	**0.002**	**4.33**	**1.00**

Notes:

1. To be conservative, emissions less than 0.0001 for each HAP were rounded up to 0.0001 lb/hr and 0.0001 TPY.
2. Emissions as represented in Permit R13-3349, issued April 10, 2017.
3. Refer to Table 5 for engine potential emissions calculations.

TABLE 3

FACILITY-WIDE POTENTIAL ROAD EMISSIONS SUMMARY
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Emissions Source	Emission Point Identification	Pollutants					
		$PM_{2.5}$		PM_{10}		PM_{TOT}	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Unpaved Roads	E026 (1)	0.03	0.14	0.33	1.43	1.11	4.86
Total Unchanged Emissions		**0.03**	**0.14**	**0.33**	**1.43**	**1.11**	**4.86**

Notes:

1 . Emissions as represented in Permit R13-3349, issued April 10, 2017.

TABLE 4

ESTIMATION OF FACILITY-WIDE GHG EMISSIONS
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

GHG Emission Source	Total GHG Emissions (m.t. CO_2e)	(tons CO_2e)
Natural Gas Combustion	6,971	7,684
Tanks	333	367
Fugitives	366	403
Flares	11,725	12,925
Total Estimated Facility Emissions:	19,396	21,380

Conversion Factors		Global Warming Potential	
1.10231	ton/m.t.	CO_2	1
0.001	mJ/kg	CH_4	25
8,760	Hrs/yr	N_2O	298

CO_2 (mol %)	CH_4 (mol %)	C_2H_6 (mol %)	C_3H_8 (mol %)	C_4H_{10} (mol %)	C6+ (mol %)
0.17%	79.70%	13.72%	3.89%	1.44%	0.84%

Note:
Carbon Dioxide Equivalent (CO_2e) emissions are calculated in the tables below by multiplying emissions by global warming potentials for each pollutant.
Emissions estimates converted to short tons in the tables below using conversion factor from 40 CFR 98 Subpart A.
Global Warming Potentials obtained from 40 CFR 98 Subpart A, Table A-1.
Mol % values obtained from the gas analysis from the facility.

Natural Gas & Diesel Combustion Emissions

Emissions Source	Emission Point Identification	Rated Horsepower	Capacity (MMBtu/hr)	BSFC (Btu/hp-hr)	Operation (hr/yr)	Emissions Factors [1] CO_2 (kg/MMBtu)	CH_4 (kg/MMBtu)	N_2O (kg/MMBtu)	Emissions (m.t.) CO_2	CH_4	N_2O	Emissions (m.t CO_2e) CO_2	CH_4	N_2O	Total Emissions (m.t. CO_2e)	(tons CO_2e)
WSG-1068 6.8L Generator (189 Hp)	E022A	189	0.48	2,554	8,760	53.06	0.001	0.0001	224.37	0.004	0.0004	224.37	0.11	0.13	225	248
Gas Production Unit (1.50 MMBtu/hr)	E001	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Gas Production Unit (1.50 MMBtu/hr)	E002	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Gas Production Unit (1.50 MMBtu/hr)	E003	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Gas Production Unit (1.50 MMBtu/hr)	E004	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Line Heater (1.50 MMBtu/hr)	E005	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Line Heater (1.50 MMBtu/hr)	E006	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Line Heater (1.50 MMBtu/hr)	E007	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Line Heater (1.50 MMBtu/hr)	E008	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
Flash Separator Heater (1.00 MMBtu/hr)	E009	—	1.00	—	8,760	53.06	0.001	0.0001	464.81	0.009	0.0009	464.81	0.22	0.26	465	513
Line Heater (1.50 MMBtu/hr)	E023	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.013	0.0013	697.21	0.33	0.39	698	769
														Total Natural Gas Combustion:	6,971	7,684

Notes:
1. Emission factors for GHG obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2.

Tank Sources

Emissions Source	Emission Point Identification	Annual Condensate Production (bbl/yr)	Annual Condensate Production (1,000 gal/yr)	Default Liquid CH_4 Content [1] (mol %)	Average API Gravity	Average Separator Pressure (psig)	Separator Temperature (°F)	Dissolved Gas Gravity (SG_g)	Actual VOC Gas/Oil Ratio (scf/bbl oil)	Emissions [2] CH_4 (m.t.)	Total Emissions (m.t. CO_2e)	(tons CO_2e)	Control Efficiency (%)	Total Controlled Emissions (m.t. CO_2e)	(tons CO_2e)
Condensate Storage Tank (400-bbl)	E011	6,692	281	27.4	63	100	80	0.90	886.00	31.15	778.83	858.51	98%	15.58	17.17
Condensate Storage Tank (400-bbl)	E012	6,692	281	27.4	63	100	80	0.90	886.00	31.15	778.83	858.51	98%	15.58	17.17
Condensate Storage Tank (400-bbl)	E013	6,692	281	27.4	63	100	80	0.90	886.00	31.15	778.83	858.51	98%	15.58	17.17
Produced Water Storage Tank (400-bbl)	E014	48,058	2,018	27.4	63	100	80	0.90	886.00	2.24	55.93	61.66	98%	1.12	1.23
Produced Water Storage Tank (400-bbl)	E015	48,058	2,018	27.4	63	100	80	0.90	886.00	2.24	55.93	61.66	98%	1.12	1.23
Produced Water Storage Tank (400-bbl)	E016	48,058	2,018	27.4	63	100	80	0.90	886.00	2.24	55.93	61.66	98%	1.12	1.23
													Total Tanks:	50	55

Notes:
1. Default CH4 content for crude oil per API compendium Section 5.4 and Appendix B.
2. Emissions estimated using API Compendium, Section 5.4.

Truck Loading

Emissions Source	Emission Point Identification	Annual Condensate Production (bbl/yr)	Annual Condensate Production (1,000 gal/yr)	Default Liquid CH_4 Content [1] (mol %)	Emission Factor VOC (lb/1,000 gal)	Emissions VOC (tons)	VOC (m.t.)	Emissions [2] CH_4 (m.t.)	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Condensate Truck Loading	E020	20,075	843	27.4	55.00	23.19	21.03	5.78	144	159
Produced Water Truck Loading	E021	144,175	6,055	27.4	7.37	22.31	20.24	5.55	139	153
								Total Loading:	283	312

Notes:
1. Default CH4 content for crude oil per API compendium Section 5.4 and Appendix B.
2. Emissions estimated using API Compendium, Section 5.5.

Fugitive Sources

Source Type/Service [1]	Number of Sources	Maximum Hours of Operation	CO_2 (mol %)	CH_4 (mol %)	Emission Factor CH_4 (m.t./hr/component)	Emissions [2] CO_2 (m.t.)	CH_4 (m.t.)	Emissions CO_2 (m.t. CO_2e)	CH_4 (m.t. CO_2e)	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Valves - Gas/Vapor	200	8,760	0.0017	0.7970	0.0000045	0.0358	6.28	0.0358	157.09	157.13	173.20
Flanges - Gas/Vapor	700	8,760	0.0017	0.7970	0.00000039	0.0109	1.91	0.0109	47.66	47.66	52.54
Compressor Seals - Gas/Vapor	0	8,760	0.0017	0.7970	0.0000024	0.0000	0.00	0.0000	0.00	0.00	0.00
Relief Valves - Gas/Vapor	20	8,760	0.0017	0.7970	0.000017	0.0135	2.37	0.0135	59.36	59.36	65.43
Valves - Light Liquid	200	8,760	0.0017	0.7970	0.0000025	0.0199	3.49	0.0199	87.27	87.29	96.22
Flanges - Light Liquid	25	8,760	0.0017	0.7970	0.00000011	0.00011	0.02	0.00011	0.48	0.48	0.53
Pump Seals - Light Liquid	0	8,760	0.0017	0.7970	0.000013	0.0000	0.00	0.0000	0.00	0.00	0.00
Relief Valves - Light Liquid	15	8,760	0.0017	0.7970	0.00000539	0.0032	0.56	0.0032	14.11	14.12	15.56
									Total Fugitives:	366	403

Notes:
1. Number of each component and type of service estimated based on a similar station.
2. Emission estimated using API Compendium, Section 6.0, Tables 6-12 and 6-21.

Flares

Emissions Source	Emission Point Identification	Burner Rating (MMBTu/hr)	Annual Gas Usage [1] (scf/yr)	CO_2 (mol %)	CH_4 (mol %)	Emission Factor N_2O (m.t./MMscf)	Emissions [2] CO_2 (m.t.)	CH_4 (m.t.)	N_2O (m.t.)	Emissions CO_2 (m.t. CO_2e)	CH_4 (m.t. CO_2e)	N_2O (m.t. CO_2e)	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Enclosed Combustor (18.42 MMBtu/hr)	E019	18.4	158,195,294	0.0017	0.7970	5.90E-07	10,519	46	0.00009	10,519	1,206	0.028	11,725	12,925
												Total Flare Emissions:	11,725	12,925

Notes:
1. Annual gas usage calculated using the gas heating value of 1,020 Btu/scf.
2. Emissions estimated using API Compendium, Section 4.6 for Flare Emissions.

TABLE 5

POTENTIAL EMISSIONS SUMMARY
WSG-1068 6.8L GENERATOR (E022A)
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Horsepower	Emission Factors [2]	Potential Emission Rate [3]	
			(lb/hr)	(T/yr)
NO_X	189	1.00	0.42	1.83
VOC	189	0.70	0.29	1.28
CO	189	2.00	0.83	3.65
PM	189	0.01941	0.01	0.04
FORMALDEHYDE	189	0.0205	0.01	0.04
ACETALDEHYDE	189	0.00279	0.001	0.01
ACROLEIN	189	0.00263	0.001	0.01
METHANOL	189	0.00306	0.001	0.01
BENZENE	189	0.00158	0.001	0.003
TOLUENE	189	0.000558	0.0003	0.001
ETHYL-BENZENE	189	0.0000248	<0.0001	0.0001
XYLENES	189	0.000195	0.0001	0.0004

Notes:

1. Emissions of SO2 are assumed to be negligible and not reportable.
2. Emission Factors obtained from NSPS Subpart JJJJ and AP-42.

NO_X =	1.00	g/hp-hr NSPS Subpart JJJJ preamble Table 4, January 18, 2008.
VOC =	0.70	g/hp-hr NSPS Subpart JJJJ preamble Table 4, January 18, 2008.
CO =	2.00	g/hp-hr NSPS Subpart JJJJ preamble Table 4, January 18, 2008.
PM =	0.01941	lb/MMBtu AP-42 Table 3.2-3.
Formaldehyde =	0.0205	lb/MMBtu AP-42 Table 3.2-3.
Acetaldehyde =	0.00279	lb/MMBtu AP-42 Table 3.2-3
Acrolein =	0.00263	lb/MMBtu AP-42 Table 3.2-3
Methanol =	0.00306	lb/MMBtu AP-42 Table 3.2-3
Benzene =	0.00158	lb/MMBtu AP-42 Table 3.2-3
Toluene =	0.000558	lb/MMBtu AP-42 Table 3.2-3
Ethyl-Benzene =	0.0000248	lb/MMBtu AP-42 Table 3.2-3
Xylenes =	0.000195	lb/MMBtu AP-42 Table 3.2-3

3. Potential emissions based on emission factors, maximum horsepower, a brake specific fuel consumption of 2,554 btu/hp-hr, and 8,760 hours of operation per year.

TABLE 6

GAS ANALYSIS
MARY MILLER FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Component [1]	Molecular Weight	Mol % [2]	Molar Weight [3]	Average Mass % [4]
Carbon Monoxide	28.01	0.000%	0.000	0.000%
Hydrogen Sulfide	34.08	0.000%	0.000	0.000%
Oxygen	16.04	0.000%	0.000	0.000%
Helium	4	0.000%	0.000	0.000%
Nitrogen	28.02	0.241%	0.068	0.333%
Carbon Dioxide	44.01	0.165%	0.073	0.358%
Methane	16.04	79.701%	12.784	62.970%
Ethane	30.07	13.718%	4.125	20.319%
Propane	44.09	3.893%	1.716	8.455%
i-Butane	58.12	0.561%	0.326	1.606%
n-Butane	58.12	0.882%	0.513	2.525%
i-Pentane	72.15	0.271%	0.196	0.963%
n-Pentane	72.15	0.194%	0.140	0.689%
Other Hexanes	86.17	0.138%	0.119	0.585%
n-Hexane	86.17	0.032%	0.028	0.136%
Heptanes	100.2	0.063%	0.063	0.310%
2,2,4-Trimethylpentane	114.23	0.018%	0.021	0.101%
Benzene	78.11	0.007%	0.006	0.028%
Toluene	92.14	0.026%	0.024	0.118%
Octanes +	114.23	0.084%	0.096	0.474%
e-Benzene	106.17	0.001%	0.001	0.005%
Xylenes	106.17	0.005%	0.005	0.025%
Totals:		100.00%	20.30	100.00%
[5] VOC Totals:		6.18%	3.25	16.02%

Notes:

1. Typical components listed in gas analysis for field gas.
2. Mol % values obtained from the gas analysis from a representative facility.
3. Molar weight = Molecular weight x Mol % /100.
4. Average mass % = Molar weight / Total molar weight.
5. VOC Totals include the following components (C3+):

Propane	n-Hexane
i-Butane	Heptanes
n-Butane	Benzene
i-Pentane	Toluene
n-Pentane	Octanes
Hexanes	e-Benzene
	Xylenes

Compositional Analysis of Separator Gas

RFS ID No. 42552-02
Sample date and time: March 25, 2015 at 1625 hours
Sampling Conditions: 676 psia at 80 °F
Opening Conditions: 721 psia at 120 °F

	Component	Mole %	GPM at 14.85 psia	Weight %	Molecular Weight
N_2	Nitrogen	0.241	0.000	0.332	28.013
CO_2	Carbon Dioxide	0.165	0.000	0.357	44.010
H_2S	Hydrogen Sulfide *	0.000	0.000	0.000	34.082
C1	Methane	79.701	0.000	62.995	16.043
C2	Ethane	13.718	3.692	20.322	30.070
C3	Propane	3.893	1.081	8.457	44.097
iC4	Iso-Butane	0.561	0.185	1.608	58.123
nC4	N-Butane	0.882	0.280	2.524	58.123
iC5	Iso-Pentane	0.271	0.100	0.964	72.150
nC5	N-Pentane	0.194	0.071	0.689	72.150
C6	Hexanes	0.177	0.074	0.752	86.177
C7	Heptanes	0.089	0.040	0.427	97.327
C8	Octanes	0.056	0.026	0.299	107.827
C9	Nonanes	0.052	0.020	0.274	106.167
C10+	Decanes Plus	0.000	0.000	0.000	134.000
	Total	100.000	5.569	100.000	

* Please note that 0 ppm H_2S was detected in the field by stain tube

Calculated Properties of Gas			Data at 14.85 psia	
Gas Specific Gravity (Air = 1.00)		=	0.7029	
Net Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Dry	=	1,130.8	Real
Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Dry	=	1,247.5	Real
Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Wet	=	1,225.7	Water Sat.
Gas Compressibility (1 Atm. at 60 °F)	Z	=	0.9967	

☐Heat of combustion is the quantity of heat produced when gas is burned completely to carbon dioxide and water.
☐Wet and dry refer to the condition of the gas prior to combustion.
☐Wet refers to a gas that is saturated with water vapor, and dry refers to a gas that contains no water vapor prior to combustion.
☐Net and gross refer to the condition of the water resulting from combustion.
☐Gross heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of the combustion products condensed to the liquid state.
☐Net heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of combustion products remains in the vapor phase.

Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans

Monitoring/Recordkeeping/Reporting/Testing Plans

Ascent will monitor, record, report, and test as required by 45CSR13.

Ascent will maintain a Certificate of Conformity for the generator (E022A), as required by 40 CFR Part 60 NSPS Subpart JJJJ.

Attachment P: Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Ascent Resources – Marcellus, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Class II Administrative Update for the Mary Miller facility located near Wileyville, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39.6149°N, -80.6138°W.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

NO_x = 13.51 TPY
CO = 38.72 TPY
VOC = 29.34 TPY
PM_{10} = 0.52 TPY
SO_2 = <0.01 TPY
HAPs = 1.00 TPY

Startup of operation is planned to begin on or about the 15th day of May, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 11th day of May, 2017.

By: Ascent Resources – Marcellus, LLC
John Adcock
VP - Operations
PO Box 13678
Oklahoma City, OK 73113

Application Fee